# CITRUS ADVANCED TECHNOLOGY PROGRAM

**QUARTERLY & FINAL REPORTS:** Control of Citrus Greening, Canker & Emerging Diseases of Citrus

**SELECT PERIOD** September 2016

(●) *Quarterly Report* ( ) *Final*

Proposal Title

Disrupt LuxR solo quorum sensing that mediates plant virulence and insect transmission of Candidatus Liberibacter asiaticus to control the disease

| Today's Date | Sponsoring Organization (drop-down) | Category (drop down) |
|---|---|---|
| 12-05-2016 | Citrus Research and Development Foundation | Infection Consequences |

**REPORT UPDATE** (500 words-It is not necessary in this public report to disclose your institution's proprietary information or intellectual property.)

We demonstrated that the Genome of Candidatus Liberibacter asiaticus (CLas) possess luxR gene that encodes LuxR protein, one of the two components typical of bacterial "quorum sensing". However, the genome lacks the second component; luxI that produce Acyl-Homoserine Lactones (AHLs) suggesting that CLas has a solo LuxR system.

In the current project, we have only one objective: study the effect of AHL-producing citrus plants on the pathogenicity of CLas.

We have selected different Lux-I genes from different bacteria expressing structurally different AHLs. We used synthesized genes (G-Blocks).
1- Agrobacterium tumefaciens N-(B-oxo-octan-1-oyl)-L-homoserine lactone(Hwang et al., 1994)
TraI Accession number#L22207.1
2- Pseudomonas fluorescens Six acyl-HSLs, including the 3-hydroxy forms, N-(3-hydroxy-hexanoyl)-L-homoserine lactone (3-OH-C6-HSL), N-(3-hydroxy-octanoyl)-L-homoserine lactone (3-OH-C8-HSL), and
N-(3-hydroxy-decanoyl)-L-homoserine lactone (3-OH-C10-HSL); the alkanoyl forms hexanoyl-homoserine lactone (C6-HSL) and octanoyl-homoserine lactone (C8-HSL)(Khan et al., 2005) PhzI Accession number#AAC18898.1
3-Rhizobium leguminosarum bv. viciae 3-OH-C14:1-HSL (Wilkinson et al., 2002, Edwards et al., 2009) CinI Accession number#AF210630
4-Serratia liquifaciens N-(butyryl)-L- homoserine lactone (BHL) (Oulmassov et al., 2005) SwrI Accession number#U22823.1
5- Vibrio fischeri OHHL (Schaefer et al., 1996) LuxI Accession number#AAD48474.1

We successfully, created the vectors and infiltrated in Citrus macrophilla.
The plants will be ready for evaluation by January 2017.
Our aim is to interfere with CLas signaling by expressing AHL which will enhance the bacterial aggregation and attachment and results in localization of the bacterium in certain branches.


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*Project Number* 15-17

*Project Duration (years)* 2 *Year of Project* 1

*Total Funds (current year)* $87640